

MATHEMATICS

Nationality

No.

(Please print full name, underlining family name)

Name

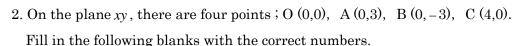
Marks

Note that all the answers should be written on the answer sheet.

- 1. Fill in the following blanks with the correct numbers.
- (1) When a > 0, then what is the range of x that satisfies the following inequality:  $ax^2 3ax + 2a < 0$

- (2) If  $4^{3x-1} 2^{5x-4} = 0$ , then x =
- (3)  $10^{\log_{10} 5} =$  .
- (4) When  $\alpha$  and  $\beta$  are the solutions of the quadratic equation  $x^2 5x + 3 = 0$ , then  $\alpha^2 + \beta^2 = \boxed{\textcircled{1}}$ ,  $(\alpha \beta)^2 = \boxed{\textcircled{2}}$ .
- (5) When  $|\vec{a}| = 1$ ,  $|\vec{b}| = 2$ ,  $|\vec{a} \vec{b}| = \sqrt{7}$ , then the degree measure of the angle between  $\vec{a}$  and  $\vec{b}$  is  $\boxed{\phantom{a}}$  °.
- (6) When  $\triangle ABC$  is a triangle where  $\angle A=30^{\circ}$ , then  $\sin(\angle B+\angle C)$  is
- (7) How many multiples of 3 are there among integers from 100 to 200? The answer is  $\bigcirc$  , and the sum of those multiples of 3 is  $\bigcirc$  .
- (8) When  $x^3 + ax^2 + bx + 5$  is divisible by x 1 and has a remainder of 5 when divided by x 2, then  $a = \boxed{1}$ ,  $b = \boxed{2}$ .
- (9) Let  $f(x) = |x^2 1|$ . Then  $f(0) = \boxed{1}$ ,  $\int_0^2 f(x) dx = \boxed{2}$
- (10) Assume that a,b and c are consecutive terms of arithmetic progression (a < b < c). If a + b + c = 24 and abc = 440, then  $a = \boxed{①}$ ,  $b = \boxed{②}$ ,  $c = \boxed{③}$ .





- (1) The equation of the straight line AC is x + y 3 = 0
- (3) When point D is the intersection of bisector of  $\angle ABC$  and x-axis, then  $OD:DC=\boxed{\textcircled{1}}:\boxed{\textcircled{2}}$  and the coordinates of the inner center of  $\triangle ABC$  are  $\boxed{\textcircled{3}}$ ,  $\boxed{\textcircled{4}}$ .
- 3. The line (a); y = x + k ( k is a constant) is tangent to both the parabola (b);  $y = x^2 5x + 7$  and the parabola (c);  $y = x^2 + 3x 1$ .

Point P is the point of tangency of the line (a) and the parabola (b), point Q is the point of tangency of the line (a) and the parabola (c) and point R is the intersection of the parabola (b) and the parabola (c).

Fill in the following blanks with the correct numbers.

- (1) The constant  $k = \boxed{\phantom{a}}$ .
- (2) The x-coordinate of the point P is  $\bigcirc$  , the x-coordinate of the point Q is  $\bigcirc$  and the x-coordinate of the point R is  $\bigcirc$  .
- (3) The area surrounded by the line (a), the parabola (b) and the parabola (c) is

